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A NEW CRAYFISH OF THE GENUS *FALLICAMBARUS* FROM TENNESSEE (DECAPODA, ASTACIDAE)

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Among the many undescribed crayfishes known to occur in Tennessee, this new member of the burrowing genus *Fallicambarus* was dug from comparatively simple shallow burrows constructed in sandy soil near a small tributary to the Hatchie River in McNairy County. Its range lies along the edge of the boundary of that outlined for the genus by Hobbs (1969: 124), extending "from southern Ontario, Michigan and Illinois southward to Texas and across western Tennessee to southwestern Georgia; east of the Appalachians it extends from Maryland to South Carolina."

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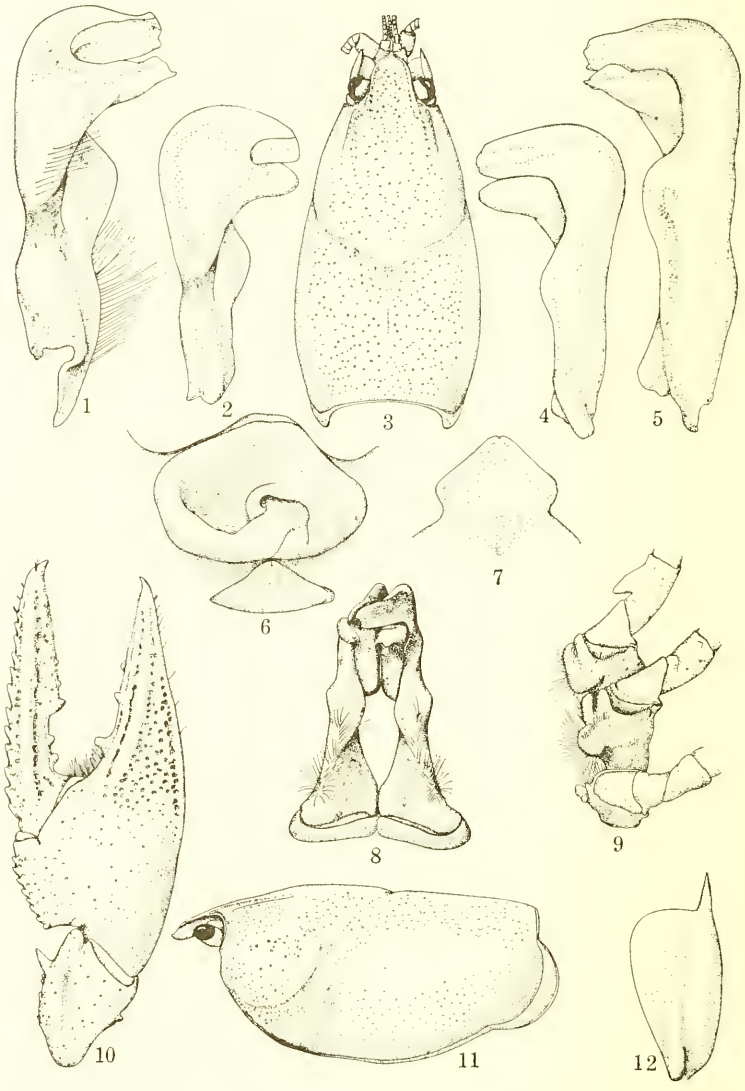
Fallicambarus hortoni new species

Diagnosis: Body pigmented, eyes well-developed. Rostrum depressed, acuminate, and devoid of marginal spines or tubercles. Areola obliterated or linear, its projected extent comprising 36.0 to 38.2 per cent of entire length of carapace. Cervical spines or tubercles lacking. Suborbital angle weak, obtuse. Postorbital ridges terminating cephalically with or without very small tubercles. Antennal scale 2.3 to 2.5 times longer than broad, broadest distal to midlength. Chela with two rows of tubercles on mesial surface of palm; lateral margin of chela costate and both fingers with well-defined longitudinal ridge on upper surface; dactyl with distinct emargination. First sinistral pleopod (Figs. 1, 5, 8) of first form male with corneous central projection recurved at approximately 90 degrees and strongly deflected dextrally, scarcely tapering distally, broadly truncate with subapical notch lacking, or perhaps represented by shallow emargination; non-corneous mesial process only slightly tapering



FIGS. 1–12. *Fallicambarus hortoni* new species (pubescence removed from all structures illustrated except for Figs. 1, 8, 9, 10). 1, Mesial view of first pleopod of holotype. 2, Mesial view of first pleopod of morphotype. 3, Dorsal view of carapace of holotype. 4, Lateral view or first pleopod of morphotype. 5, lateral view of first pleopod of

distally, eminence on morphological cephalic border almost at tip of process and overlapping central projection laterally with small constricted distal portion extending slightly beyond tip of central projection. Annulus ventralis (Fig. 6) immovable, approximately 1.6 times broader than long, deeply excavate dextrally, and with conspicuous tongue sloping cephalosinistrally from elevated caudal wall. Color olive brown with irregular dark and light markings and sometimes with median longitudinal pale olive-tan stripe.

Holotypic Male, Form I: Body subovate, slightly compressed. Abdomen narrower than cephalothorax (11.0 and 12.6 mm). Carapace broader than depth at caudodorsal margin of cervical groove (12.6 and 10.8 mm). Areola linear and constituting 37.5 per cent of entire length of carapace; cephalic section of carapace 1.7 times longer than areola. Rostrum depressed, acuminate, excavate dorsally with converging thickened margins; marginal spines or tubercles lacking; upper surface with conspicuous, deep punctations, submarginal rows of setiferous punctations becoming progressively shallower toward apex; acumen slightly upturned and reaching slightly beyond base of ultimate podomere of peduncle of antennule; subrostral ridges visible in dorsal aspect almost to midlength of rostrum. Postorbital ridges strong, grooved dorsolaterally, and terminating cephalically without tubercles. Suborbital angle obtuse and weak. Branchiostegal spine reduced to angle. Carapace with many prominent setiferous punctations dorsally and dorsolaterally, but less dense cephalolaterally, and with setiferous squamous tubercles on lateral branchiostegal region, anteriormost forming row along caudoventral margin of cervical groove. Cervical spines or tubercles lacking. Abdomen longer than carapace (26.2 and 24.5 mm). Cephalic portion of telson with two strong spines in each caudolateral corner, mesial ones movable. Uropods with distolateral margin and distal end of submedian ridge of outer ramus with strong acute spines, that on ridge almost reaching distal margin of ramus; distal portion of proximal segment of inner ramus with row of strong acute spines; basal segment of uropods with strong mesiodistal acute spine overlapping base of outer ramus; smaller acute laterodistal spine also present.

Epistome (Fig. 7) about 1.5 times longer than broad, subtriangular, nearly plane, and bearing small apical notch and shallow caudomedian fovea. Antennules of usual form with well-developed small spine on mesioventral margin slightly distal to midlength. Antennae broken but probably reaching beyond midlength of abdomen. Antennal scale (Fig. 12) 2.3 times longer than broad, broadest distal to midlength with

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holotype. 6, Annulus ventralis of allotype. 7, Epistome of holotype. 8, Caudal view of first pleopods of paratypic male, form I. 9, Bases of third, fourth, and fifth pereiopods of holotype. 10, Dorsal view of distal podomeres of cheliped of holotype. 11, Lateral view of carapace of holotype. 12, Antennal scale of holotype.

widest lamellar area approximately 1.6 times width of thickened lateral portion, latter terminating in strong acute spine.

Right chela (Fig. 10) strongly depressed with palm inflated and bearing scattered punctations proximally, becoming more numerous distally, and particularly crowded and conspicuous at base of immovable finger. Inner margin of palm with mesial row of eight tubercles subtended dorsolaterally by row of eight with single tubercle immediately lateral to distal one in second-mentioned row. Ventral surface of palm with widely scattered setiferous punctations and with prominent tubercle at base of dactyl. Fingers only slightly gaping. Opposable margin of immovable finger with two prominent tubercles in proximal half and single row of minute denticles extending distally from distal tubercle; single large tubercle in proximal portion of distal half below row of denticles; upper surface with strong submedian ridge flanked by deep setiferous punctations, and less conspicuous ridge mesially; lateral margin of finger strongly costate, ridge extending proximally onto distal portion of palm; ventral surface with distinct row of setiferous punctations along lateral margin and heavily bearded in basal eighth of mesioventral portion. Opposable margin of dactyl distinctly excised, with two prominent tubercles in basal half of excision and one large tubercle at its distal end, latter tubercle followed distally by single row of minute denticles interrupted by two small tubercles; dorsal surface with strong submedian longitudinal ridge flanked by setiferous punctations, and six small tubercles flanking mesial row of punctations; mesial margin with row of 13 tubercles decreasing in size distally and extending almost entire length of dactyl.

Carpus of cheliped longer than broad with deep submedian longitudinal furrow; dorsal surface with scattered setiferous punctations; mesial surface with prominent acute spine slightly distal to midlength and with row of four much smaller spiniform tubercles proximal to it, latter flanked above and below by irregular cluster of small tubercles; ventral laterodistal and mesiodistal extremities with acute spines.

Merus of cheliped with upper surface sparsely punctate and bearing two obscure tubercles distally; mesial and lateral surfaces also sparsely punctate; ventral surface with mesial row of 15 heavy acute tubercles and lateral one of two acute tubercles in middle third. Ischium with single very small tubercle on mesial margin proximal to midlength.

Hooks on ischia of third pereiopods only (Fig. 9); hooks simple, extending proximally beyond distal margin of basis and not opposed by tubercle on latter. Coxa of fourth pereiopod with prominent longitudinally oriented furrow with conspicuous rounded elevation mesial to it and obliquely directed boss caudomesially, boss excavate anteroventrally. Coxa of fifth pereiopod with only slight caudomesial elevation.

Sternum between bases of third, fourth, and fifth pereiopods deep and with conspicuous setal mat extending mesioventrally and covering first pleopods.

First pleopods (Figs. 1, 5, 8) symmetrical basally but markedly asym-

metrically disposed distally with central projection of sinistral member of pair directed caudodextrally across median line of body, displacing corresponding element of dextral pleopod laterally (Fig. 8). Pleopods reaching base of coxae of third pereiopods when abdomen is flexed and terminating in two parts bent caudally at approximately right angles to main axis of shaft of appendage (see diagnosis for description).

Morphotypic Male, Form II: Differs from holotype in following respects: rostrum with apical tubercle much reduced, not upturned, and not reaching base of ultimate podomere of peduncle of antennule; epistome subtriangular with rounded apex; right chela apparently regenerated but mesial margin of palm of left chela with most mesial row of only 7 tubercles; distal tubercle on opposable margin of immovable finger much reduced; mesial margin of dactyl with row of 12 tubercles and with row of 5 tubercles immediately lateral to it; carpus of chela not so distinctly longer than broad, and major spine on mesial surface surrounded by irregularly arranged tubercles; upper distal surface of merus with three small tubercles, ventrolateral margin with three spines; hooks on ischia of third pereiopods and ornamentation of coxa of fourth not so strongly developed.

First pleopod (Figs. 2, 4) with no corneus elements; central projection broadly rounded with faint indication of emarginations apically; mesial process also broadly rounded and directed somewhat laterally with eminence on morphological cephalic border much reduced; basal "segment" of pleopod delimited by suture.

Allotypic Female: Differs from holotype in following respects: abdomen and cephalothorax subequal in width; mesial row of six tubercles on inner margin of palm of chela subtended dorsolaterally by row of seven; opposable margin of dactyl with row of four tubercles distal to large tubercle at distal end of excision; mesial surface of dactyl with lateral row of only five tubercles; carpus with two spinous tubercles aligned between strong mesial spine and mesiodistal ventral spine; dorsal surface of merus with irregular row of five tubercles distally, ventromesial margin with row of 14 and ventrolateral margin with row of three.

Sternum between last three pairs of pereiopods deep. Annulus ventralis (Fig. 6) immovable but with distinct groove between it and sternum immediately cephalic to it, about 1.6 times broader than long, and with caudal margin markedly elevated (ventrally); deep sinus originating near median line caudal to midlength, extending approximately one-fourth width of annulus, and recurving rather suddenly caudodextrad to cut caudal margin just sinistral to median line; tongue sloping cephalosinistrally from caudal wall to dip below transverse portion of sinus; usual median trough displaced dextrally, extending caudodextrally from midcephalic margin of annulus to base of elevated caudodextral wall, becoming broader and deeper caudally. Sternite immediately caudal to annulus broadly triangular, about 2.4 times broader than long, not highly elevated but with highest portion centrally situated.

Type-locality: Low area along a roadside ditch leading into a small

Measurements: As follows (in mm):

	Holotype	Allotype	Morphotype
Carapace			
Height	10.8	10.7	7.6
Length	24.5	25.9	19.2
Width	12.6	12.5	9.3
Rostrum			
Length	6.4	6.0	4.5
Width	4.1	4.3	3.4
Areola length	9.2	9.6	7.1
Chela, right			
Length of outer margin	19.0	15.9	10.9
Length of inner margin of palm	4.7	4.5	2.9
Width of palm	7.9	7.0	5.1
Length of dactyl	13.1	11.0	7.8

tributary of Cypress Creek, 7.5 miles east of the Hardeman County line on State Route 57 (Hatchie River drainage), McNairy County, Tennessee. The animals were dug from burrows (see introductory paragraph), some of which were provided with chimneys similar to those constructed by *Cambarus d. diogenes* Girard, 1852. Vegetation in the area consisted of several species of grasses and Compositae and a member of the genus *Viola*. *Salix nigra* was along the ditch, and slightly more distant were trees belonging to the genera *Acer*, *Liquidambar*, and *Liriodendron*.

Disposition of Types: The holotypic male, form I, the morphotypic male, form II, and the allotypic female are deposited in the United States National Museum (nos. 129895, 129896, and 129897, respectively). Paratypes also located at the USNM include 3 ♂ I, 3 ♂ II, 12 ♀, and in the collection of the junior author are 1 ♂ I, 1 ♀, and a damaged ♂ II. All were collected from the type-locality on 20 May 1969 by those mentioned above and the authors.

Color Notes: Carapace and abdomen drab olive-brown with olive black and pale olive tan mottlings; branchiostegal areas fading ventrally. Some specimens with discreet pattern consisting of dorsomedian longitudinal light stripe extending from base of telson cephalically to cervical groove, flanked laterally by very dark irregularly margined dark stripes from telson to at least midlength of areola. Caudodorsal margin of pleura of abdomen with pale spot. Upper surface of distal podomeres of chelae very dark, somewhat paler below with tips of fingers reddish orange. Proximal podomeres of remaining pereiopods pale, merus and more distal podomeres dark, darker dorsally than ventrally. Lateral portions of cephalic section and most of caudal section of telson dark as are inner ramus and distal segment of outer ramus of uropods and mesiodistal end of uropodal peduncle.

Range and Crayfish Associates: Fallicambarus hortoni is known only from the type-locality. No other primary burrowing species were encountered in the immediate vicinity, but *Cambarus striatus* Hay, 1902, was collected from the adjacent creek as were *Procambarus ablusus* Penn, 1963, and an undescribed species of the genus *Orconectes*. Nearby localities yielded specimens of *C. d. diogenes* Girard, 1852, and what appears to be *C. d. ludovicianus* Faxon, 1914. Further collections in the area are needed to determine the precise degree of overlap (ecological and geographical) which exists between these primary burrowing crayfishes.

Variations: Little variation was observed in the type series beyond that usually encountered in a crayfish population. In one first form male, however, the branchiocardiac grooves are sharply arced so that the areola, although obliterated, is not linear, and one punctation is evident anterior and posterior to the obliterated portion.

Relationships: Fallicambarus hortoni is the first species to be assigned originally to the genus *Fallicambarus*, Hobbs, 1969. Of the eight species previously recognized, *F. hortoni* is probably more closely allied to *F. byersi* (Hobbs, 1941) and *F. oryktes* (Penn and Marlow, 1959) than to any of the others. The latter two occur in the lower coastal plain between the Choctawhatchee River, Florida and the Pontchartrain Basin in Louisiana. The kinship is most clearly seen in the similarities of the first pleopods and annulus ventralis. More distantly, it is related to *F. fodiens* (Cottle, 1863), *F. hedgpethi* (Hobbs, 1948), and *F. uhleri* (Faxon, 1884) which species occupy the northwestern, southwestern, and eastern limits of the range of the genus. The peculiar structure of the distal portion of the first pleopod of the first form male, however, readily distinguishes it from any other crayfish.

Etymology: We are pleased to name this crayfish in honor of Horton H. Hobbs III, who, in his work on the entocytherid ostracods associated with primary burrowing crayfishes, has added greatly to our knowledge of the ranges of many of the burrowing species.

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